The opinion in support of the decision being entered today was *not* written for publication and is not binding precedent of the Board.

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte THOMAS M. ARMSTRONG, JOHN LYTLE and JOHN S. BASHKIN

Appeal No. 2006-1787
Application No. 09/746,361

ON BRIEF

Before JERRY SMITH, BARRY and HOMERE, ***Administrative Patent Judges***.

HOMERE, ***Administrative Patent Judge***.

DECISION ON APPEAL

This is a decision on appeal under 35 U.S.C. § 134 from the final rejection of claims 1 through 21, all of which are pending in this application.

We affirm.

Invention

Appellants' invention relates generally to a transparent fluid conduit for use in analyzing DNA and protein samples. The fluid conduit consists of an optical analysis chamber (figure 4) having an optically transmissive elongate tubular capillary body (30) with an elongate tubular capillary body wall (32). The body wall (32) includes an interior surface (36) and an exterior surface (34), whereby the interior surface of the capillary body wall (36) defines an elongate separation chamber, bore or sample passageway (38) for containing the sample material being analyzed. The body wall (32) also includes a first optically transmissive window (40) having a substantially convex exterior surface portion through which optical radiation passes. The window also has a non-uniform thickness about the separation chamber in such a way to optimize the optical coupling for analyzing the sample material.

Claim 1 is representative of the claimed invention and is reproduced as follows:

1. An optical analysis chamber, comprising:

An optically transmissive elongate tubular body having an elongate tubular body wall including an interior surface and an exterior surface, said interior surface of said body wall defining an elongate separation chamber that is in direct contact with a sample material being analyzed;

wherein said body wall further includes a first optically transmissive window, said window having a substantially convex exterior surface portion, through which optical radiation passes, said window having a non-uniform thickness about the separation chamber selected so as to optimize optical coupling therewith for analyzing said sample material.

References

The Examiner relies on the following references:

Gilby	6,239,871	May 29, 2001 (filed Aug. 24, 1999)

Rejection At Issue

A. Claims 1 through 21 stand rejected under 35 U.S.C. § 102(e) as being anticipated by Gilby.

Rather than reiterate the arguments of Appellants and the Examiner, the opinion refers to respective details in the Appeal Brief[1] and the Examiner's Answer[2]. Only those arguments actually made by Appellants have been considered in this decision. Arguments that Appellants could have made but choose not to make in the Appeal Brief have not been taken into consideration. See 37 CFR 41.37(c)(1) (vii)(eff. Sept. 13, 2004).

1 We cite to Appellants' revised Appeal Brief filed on August 04, 2005. The original Appeal Brief filed on December 19, 2003 was defective, and has therefore not been considered.
2 The Examiner mailed an Examiner's Answer on October 17, 2005.

OPINION

In reaching our decision in this appeal, we have carefully considered the subject matter on appeal, the Examiner's rejection, the arguments in support of the rejection and the evidence of anticipation relied upon by the Examiner as support for the rejection. We have, likewise, reviewed and taken into consideration Appellants' arguments set forth in the Appeal Brief along with the Examiner's rationale in support of the rejection and arguments in the rebuttal set forth in the Examiner's Answer.

After full consideration of the record before us, we agree with the Examiner that claims 1 through 21 are properly rejected under 35 U.S.C. § 102 as being anticipated by Gilby. Accordingly, we affirm the Examiner's rejection of claims 1 through 21 for the reasons set forth **infra**.

I. Under 35 U.S.C. § 102(e), is the Rejection of claims 1 through 21 as Being Anticipated By Chan Gilby?

It is axiomatic that anticipation of a claim under § 102 can be found only if the prior art reference discloses every element of the claim. **See In re King**, 801 F.2d 1324, 1326, 231 USPQ 136, 138 (Fed. Cir. 1986) and **Lindemann Maschinenfabrik GMBH v. American Hoist & Derrick Co.**, 730 F.2d 1452, 1458, 221 USPQ 481, 485 (Fed. Cir. 1984).

With respect to representative claim 1, Appellants argue in the Appeal that the Gilby reference does not disclose an interior surface of a capillary body wall defining an elongate separation chamber that is in direct contact with a sample material being analyzed. Particularly, at page 4 of the Appeal Brief, Appellants state the following:

> Appellants disagree with the Examiner's statement that the Gilby "interior surface wall defines an elongate separation chamber that is in direct contact with a sample material." Appellants submit that, unlike the current invention which the interior of the optical chamber houses the analyte sample directly, a capillary or cell has to be placed in the Gilby optical scheme, and sample analytes are contained within the capillary or cell.

To determine whether claim 1 is anticipated, we must first determine the scope of the claim. We note that claim 1 reads in part as follows:

> said interior surface of said body wall defining an elongate separation chamber that is in direct contact with a sample material being analyzed.

At page 12, lines 8 through 25, Appellants' specification states:

> Capillary 30 includes an elongate tubular body wall 32 having a substantially cylindrical exterior surface 34 and a substantially cylindrical interior surface 36. Interior surface 36 defines an elongate cylindrical sample passageway, or bore, 38 for containment of a sample material. Interior surface 36 is shown to be displaced with respect to exterior surface 34. By de-centering passageway 38 with respect to exterior surface 34, capillary 30 provides improved optical

> properties for interrogating a sample within passageway 38, by including more of the rays 44 that would ordinarily bypass the core as rays 24 do in FIG. 3. Body wall 32 includes a first portion 40 upon which incident interrogation radiation 42 is refracted through sample passageway 38. First portion 40 of body wall 32 is shown to have a non-uniform thickness about sample passageway 38 which increases the usable width W of the interrogation rays 42, and thereby increases the dwell time of any scanned interrogation beam, as well the duty fraction of the scan across the capillary. Each ray 48 represents a beam position as the interrogation beam traverses the capillary. In a similar fashion, a large interrogation beam can be used--a beam as relatively wide as dimension W can couple energy into the core for this `enhanced duty fraction` capillary. First portion 40 of body wall 32 also works to increase the collectable angular subtense of energy originating within sample passageway 38 and traveling outward through body wall 32.

We note that Appellants' claim 1 requires that the interior surface of the body wall be in direct contact[3] with the material being analyzed. However, Appellants' specification merely requires that the material being analyzed be contained within the sample passageway defined by the interior surface of the capillary body wall.

Now, the question before us is what Gilby would have taught to one of ordinary skill in the art? To answer this question, we find the following facts:

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3 In any further prosecution in this application, the Examiner should consider rejecting claim 1 under 35 U.S.C. 112, 1st paragraph since the original disclosure does not appear to provide adequate support for the limitation of the interior surface of the capillary body wall being in direct contact with the sample material.

At column 3, line 54- column 4, line 51, Gilby states the following:

> As illustrated in a first embodiment depicted by FIG. 2(a), a first section of the lens is provided in the form of a hyper-hemisphere 100. The hyper-hemisphere 100 is generally made of fused silica in order to have the same refractive index as the fused silica capillary. The hyper-hemisphere in this illustrative embodiment has a diameter of 3 mm.
>
> A substantially planar surface 102 is formed in the hyper-hemisphere 100. The substantially planar surface is located at the internal aplanatic radius. As illustrated in FIG. 2(a), a curved groove 104 is formed along the diameter of the substantially planar surface of the hyper-hemisphere 100. The groove is a half cylinder sized to fit the outside diameter of the capillary, for example, 360 .mu.m.
>
> A second section of the lens is configured to form a hemisphere 106. The hemisphere 106 is made of fused silica to match the index of refraction of the capillary. Other transparent and non-fluorescing materials could be used for the hyper-hemisphere and hemisphere. However, optimal results require that the index be close to that of the flowcell (or simply, "cell") or capillary. The hemisphere's dimensions in this illustrative embodiment have been chosen so that the size of its planar surface matches that of the hyper-hemisphere. The hemisphere could be larger or smaller than that illustrated without affecting performance. The hemispherical exterior surface 108 in the present embodiment is aluminized to form a retro-reflecting hemisphere that collects forward-scattered or fluorescent light as shown in FIG. 2(a). The hemisphere substantially increases the solid angle over which scattered light is collected. Additionally, the hemisphere increases the effective path length of the excitation beam through the sample leading to a very substantial increase in signal intensity.

A substantially planar surface 110 is formed on the hemisphere 106. Just as with that of the hyper-hemisphere, the substantially planar surface 110 of the hemisphere 106 has a curved groove 112 formed along its diameter similar in dimensions to the groove in the hyper-hemisphere.

The substantially planar surfaces of the hyper-hemisphere and the hemisphere, 102 and 110 respectively, are mated such that the groove forms a channel 114 as illustrated in FIG. 2(a). A fused silica capillary 116 with an inside diameter of, for example, 50 .mu.m, and an outside diameter of, for example, 360 .mu.m, is disposed in the channel. Narrow bore capillaries are typically used in this capillary electrophoresis embodiment because of heat transfer properties and considerations. As the bore size decreases, the surface area to volume ratio increases and, as a result, the heat transfer rate increases. This allows higher electric field strengths to be applied before Joule heating begins to degrade performance. These higher electric field strengths result in faster and more efficient separations. In addition, the lower electrical conductivity of the smaller solution volumes in narrow capillaries results in smaller currents and less Joule heating for a given applied field.

The air space 118 between the fused silica capillary and the groove is filled with an index-matched liquid or gel such as a mineral oil, salt solution, sugar solution, or the like. Index-matching liquids and gels can be obtained commercially. It is important to choose one which is transparent and non-fluorescing at the wavelengths employed. The index-matched liquid or gel couples the lens with the capillary so that the two parts effectively form one optical component. Further, since the lens and capillary are made of the same material, the general lensing effect of the capillary wall is eliminated.

With the above discussion in mind, we find that the Gilby reference teaches an optical scheme that mates the substantially planar surfaces (102, 110) of a hyper-hemisphere and a hemisphere (100, 106) such that their combined curved groves (104, 112) form a channel (114). Gilby also teaches that a fused silica capillary (116) is disposed inside of the channel (114). Additionally, Gilby teaches that the air space (118) between the fused silica capillary (116) and the channel (114) is filled with an index matched liquid or gel in such a way that the gel is placed around the capillary. One of ordinary skill in the art would have duly recognized from Gilby's teachings that the mating of the hyper-hemisphere and the hemisphere results in a capillary body, where outer surfaces of hyper-hemisphere (100) and the hemisphere (106) are equivalent to the claimed exterior wall surface while the disclosed channel (114) amounts to the claimed interior wall surface that defines an elongate separation chamber. The ordinarily skilled artisan would have also realized that Gilby's teaching of placing the index matched liquid or gel between the channel (114) and the capillary (116) amounts to the channel (114) or interior wall surface of the capillary body being in direct contact with the liquid or gel. Additionally, the ordinarily skilled artisan would have realized that the tubular

body (116) inserted in the channel is equivalent to the claimed transmissive window, of which the interior wall needs not be in direct contact with the liquid or gel. Consequently, we do not find error in the Examiner's stated position, which concludes that Gilby teaches an interior surface of a capillary body wall defining an elongate separation chamber that is in direct contact with a sample material being analyzed. Therefore, we will sustain the Examiner's rejection of claims 1 through 21 under 35 U.S.C. § 102.

CONCLUSION

In view of the foregoing discussion, we have sustained the Examiner's decision rejecting claims 1 through 21 under 35 U.S.C. § 102. Therefore, we affirm.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a)(1)(iv).

AFFIRMED

Jerry Smith

JERRY SMITH
Administrative Patent Judge

LEONARD LANCE BARRY
Administrative Patent Judge

Jean R. Homere

JEAN R. HOMERE
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